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Kawabata

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(54) **RELAY APPARATUS AND
COMPUTER-READABLE MEDIUM**

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(51) **Int. Cl.**

H04N 1/32 (2006.01)

H04N 1/00 (2006.01)

(52) **U.S. Cl.**

CPC **H04N 1/32406** (2013.01); **H04N 1/0022** (2013.01); **H04N 1/32122** (2013.01); **H04N 2201/0074** (2013.01); **H04N 2201/0093** (2013.01); **H04N 2201/3202** (2013.01); **H04N 2201/3209** (2013.01); **H04N 2201/3214** (2013.01); **H04N 2201/3215** (2013.01); **H04N 2201/3216** (2013.01); **H04N 2201/3219** (2013.01); **H04N 2201/3221** (2013.01); **H04N 2201/3223** (2013.01); **H04N 2201/3274** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,359,974	B1 *	3/2002	Ishibashi	379/100.06
6,512,593	B1 *	1/2003	Yashiki	358/1.15
7,069,503	B2 *	6/2006	Tanimoto	715/202
7,480,065	B1 *	1/2009	Trandal et al.	358/1.15
7,492,473	B2 *	2/2009	Ferlitsch et al.	358/1.15
7,826,102	B2 *	11/2010	Nakamura	358/407
2002/0051146	A1 *	5/2002	Tanimoto	358/1.9
2003/0016394	A1	1/2003	Shinomiya	
2004/0174558	A1 *	9/2004	Mori	358/1.15
2004/0252348	A1 *	12/2004	Desai	358/400
2006/0149718	A1 *	7/2006	Ohzaki	707/3
2007/0086061	A1 *	4/2007	Robbins	358/400
2007/0146802	A1 *	6/2007	Ushida	358/402
2010/0208726	A1 *	8/2010	Oliszewski et al.	370/352
2012/0274988	A1 *	11/2012	Bloomfield	358/402
2013/0088741	A1 *	4/2013	Murata et al.	358/1.14
2013/0287189	A1 *	10/2013	Cichielo et al.	379/100.17
2013/0293933	A1 *	11/2013	Rebert et al.	358/407

FOREIGN PATENT DOCUMENTS

JP	A-2003-78703	3/2003
JP	A-2004-241870	8/2004
WO	WO 0160050 A1 *	8/2001

* cited by examiner

Primary Examiner — Kimberly A Williams

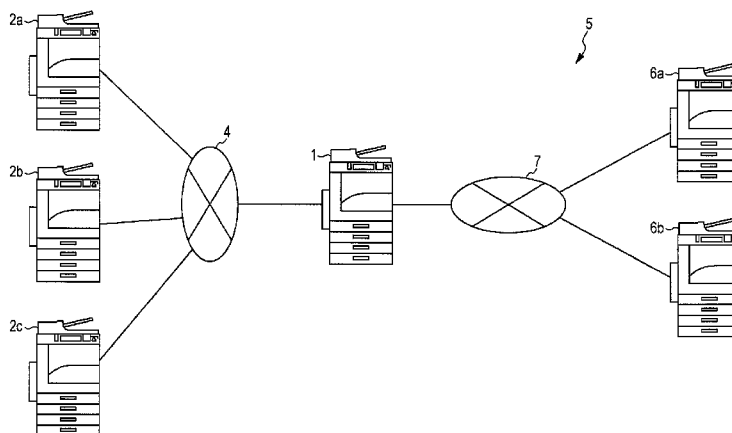
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(57)

ABSTRACT

A relay apparatus includes a reception section, a facsimile communication section, and a generation section. From terminal apparatuses having no facsimile transmission functions, the reception section receives facsimile transmission instructions along with pieces of identification information of the terminal apparatuses via a private network. The facsimile communication section performs facsimile transmission via a public network to the outside on the basis of the facsimile transmission instructions received by the reception section. The generation section generates pieces of communication result information about facsimile transmission for the respective pieces of identification information corresponding to the terminal apparatuses when the facsimile communication section performs the facsimile transmission to the outside.

8 Claims, 11 Drawing Sheets



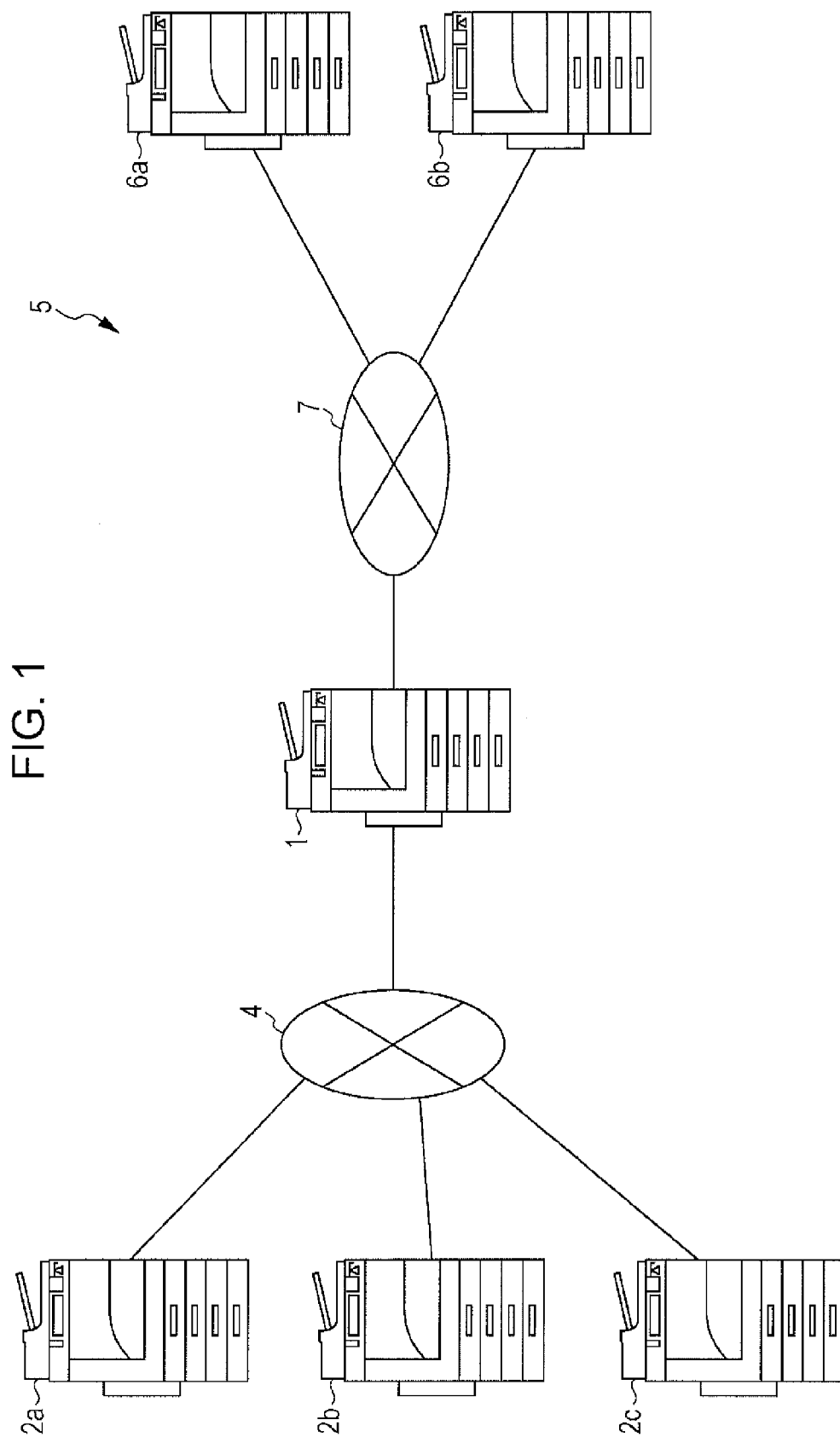


FIG. 2

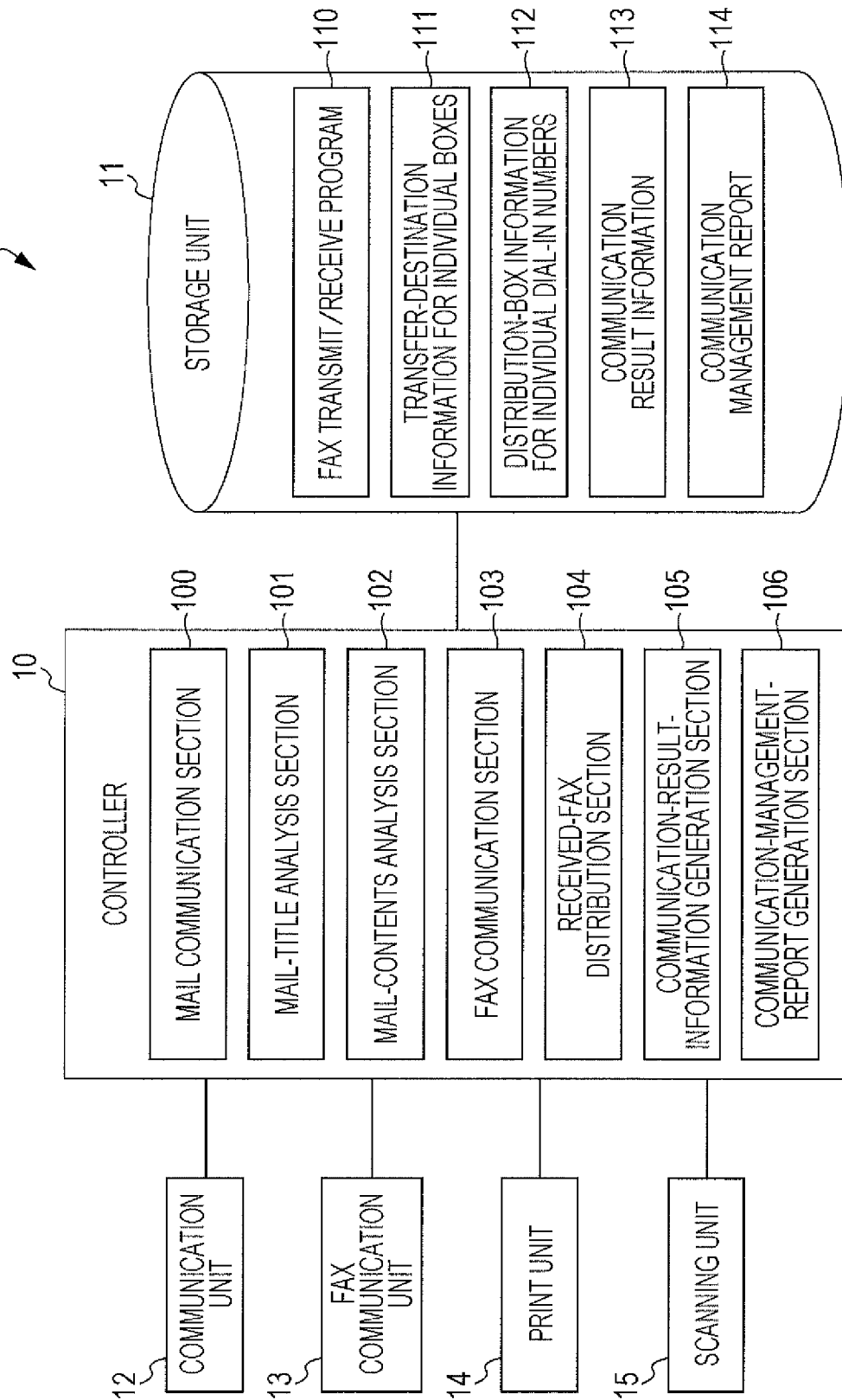
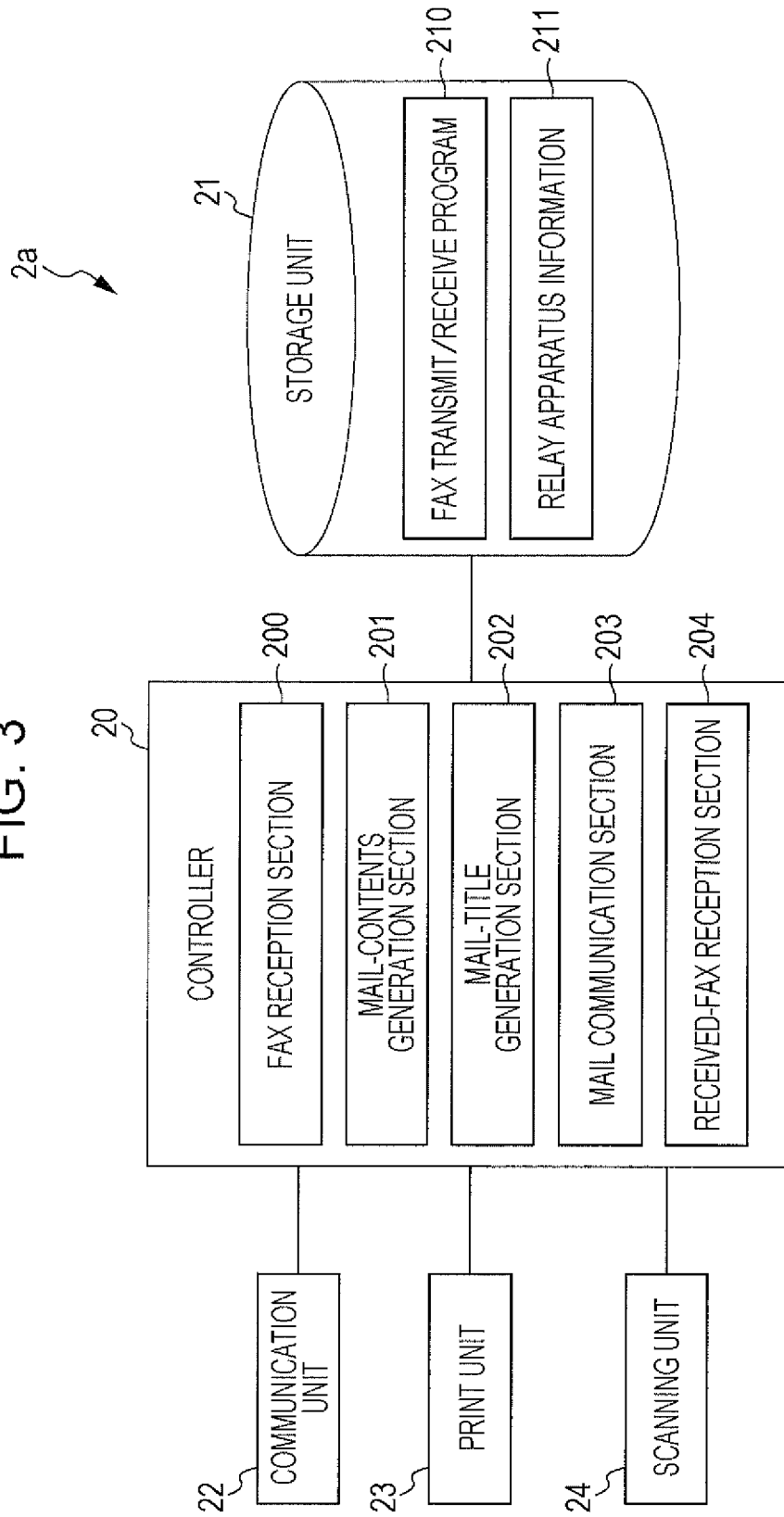


FIG. 3



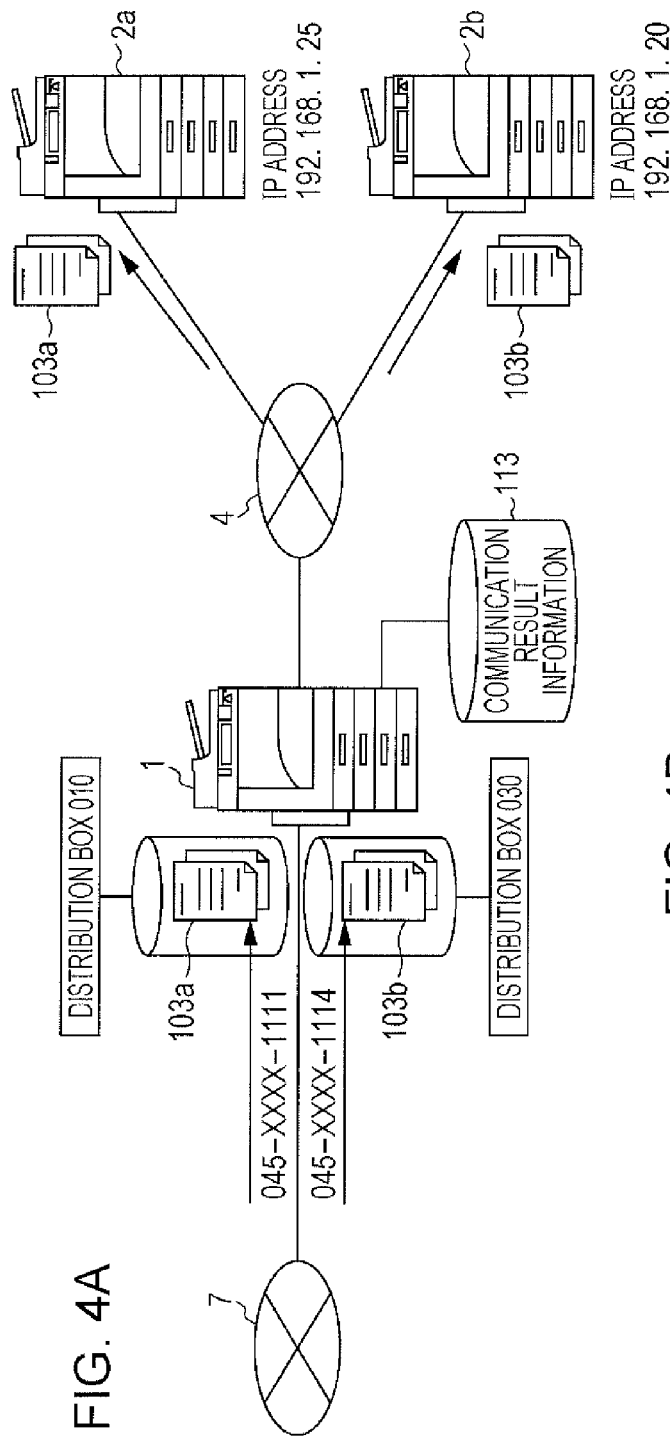


FIG. 4B

112

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045-XXXX-1111	010
045-XXXX-1112	050
045-XXXX-1113	020
045-XXXX-1114	030
045-XXXX-1115	040
...	...

111

BOX NUMBER	IP ADDRESS OF TRANSFER DESTINATION
010	192.168.1.25
020	192.168.1.30
030	192.168.1.20
040	192.168.1.40
050	192.168.1.45
...	...

FIG. 5

113A

DOCUMENT NUMBER	START DATE AND TIME	TARGET	REQUIRED TIME	THE NUMBER OF PAGES	MODE	COMMUNICATION TYPE	DISTRIBUTION BOX	COMMUNICATION RESULT
001	10-3; 17:25	03-AAAA-1111	12 SECONDS	2 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	020	NORMAL END
002	10-3; 19:25	044-BBB-9911	17 SECONDS	5 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
003	10-4; 8:26	03-AAAA-1122	15 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	050	ABNORMAL END
004	10-4; 8:27	044-BBB-9911	10 SECONDS	1 PAGE	G3	DESTINATION NUMBER DISTRIBUTION	030	NORMAL END
005	10-4; 8:37	044-BBB-9999	15 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
006	10-4; 9:00	03-AAAA-1133	14 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
007	10-4; 9:04	044-BBB-9933	12 SECONDS	3 PAGES	G3 ECM	DESTINATION NUMBER DISTRIBUTION	040	NORMAL END
008	10-4; 10:29	0522-BBB-3333	8 SECONDS	1 PAGE	G3 ECM	DESTINATION NUMBER DISTRIBUTION	010	ABNORMAL END
009	10-4; 11:30	03-AAAA-1155	17 SECONDS	5 PAGES	SG3	—	—	NORMAL END
010	10-4; 12:30	044-BBB-9988	18 SECONDS	6 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
011	10-4; 13:41	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
012	10-4; 13:50	03-AAAA-1166	15 SECONDS	4 PAGES	SG3	—	—	NORMAL END
013	10-4; 13:55	0522-BBB-3333	13 SECONDS	3 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	020	NORMAL END
014	10-4; 14:32	044-BBB-9911	11 SECONDS	2 PAGES	G3 ECM	DESTINATION NUMBER DISTRIBUTION	030	NORMAL END
015	10-4; 14:34	03-AAAA-1177	15 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
016	10-4; 14:35	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	020	NORMAL END
017	10-4; 15:35	044-BBB-8833	40 SECONDS	2 PAGES	G3 ECM	DESTINATION NUMBER DISTRIBUTION	010	ABNORMAL END
018	10-4; 16:01	03-AAAA-1111	15 SECONDS	4 PAGES	SG3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
019	10-4; 16:15	06-CCCC-2211	90 SECONDS	8 PAGES	G3	DESTINATION NUMBER DISTRIBUTION	010	NORMAL END
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FIG. 6

114a


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SENDER NAME: FXAT AAA DEVELOPMENT DIVISION							
NO.	DOCUMENT NUMBER	START DATE AND TIME	TARGET	REQUIRED TIME	THE NUMBER OF PAGES	MODE	COMMUNICATION RESULT
1	002	10-3; 19:25	044-BBB-9911	17 SECONDS	5 PAGES	SG3	NORMAL END
2	005	10-4; 8:37	044-BBB-9999	15 SECONDS	4 PAGES	SG3	NORMAL END
3	006	10-4; 9:00	03-AAAA-1133	14 SECONDS	4 PAGES	SG3	NORMAL END
4	008	10-4; 10:29	0522-BBB-3333	8 SECONDS	1 PAGE	G3 ECM	ABNORMAL END
5	010	10-4; 12:30	044-BBB-9988	18 SECONDS	6 PAGES	SG3	NORMAL END
6	011	10-4; 13:41	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	NORMAL END
7	015	10-4; 14:34	03-AAAA-1177	15 SECONDS	4 PAGES	SG3	NORMAL END
8	017	10-4; 15:35	044-BBB-8833	40 SECONDS	2 PAGES	G3 ECM	ABNORMAL END
9	018	10-4; 16:01	03-AAAA-1111	15 SECONDS	4 PAGES	SG3	NORMAL END
10	019	10-4; 16:15	06-CCCC-2211	90 SECONDS	8 PAGES	G3	NORMAL END

FIG. 7

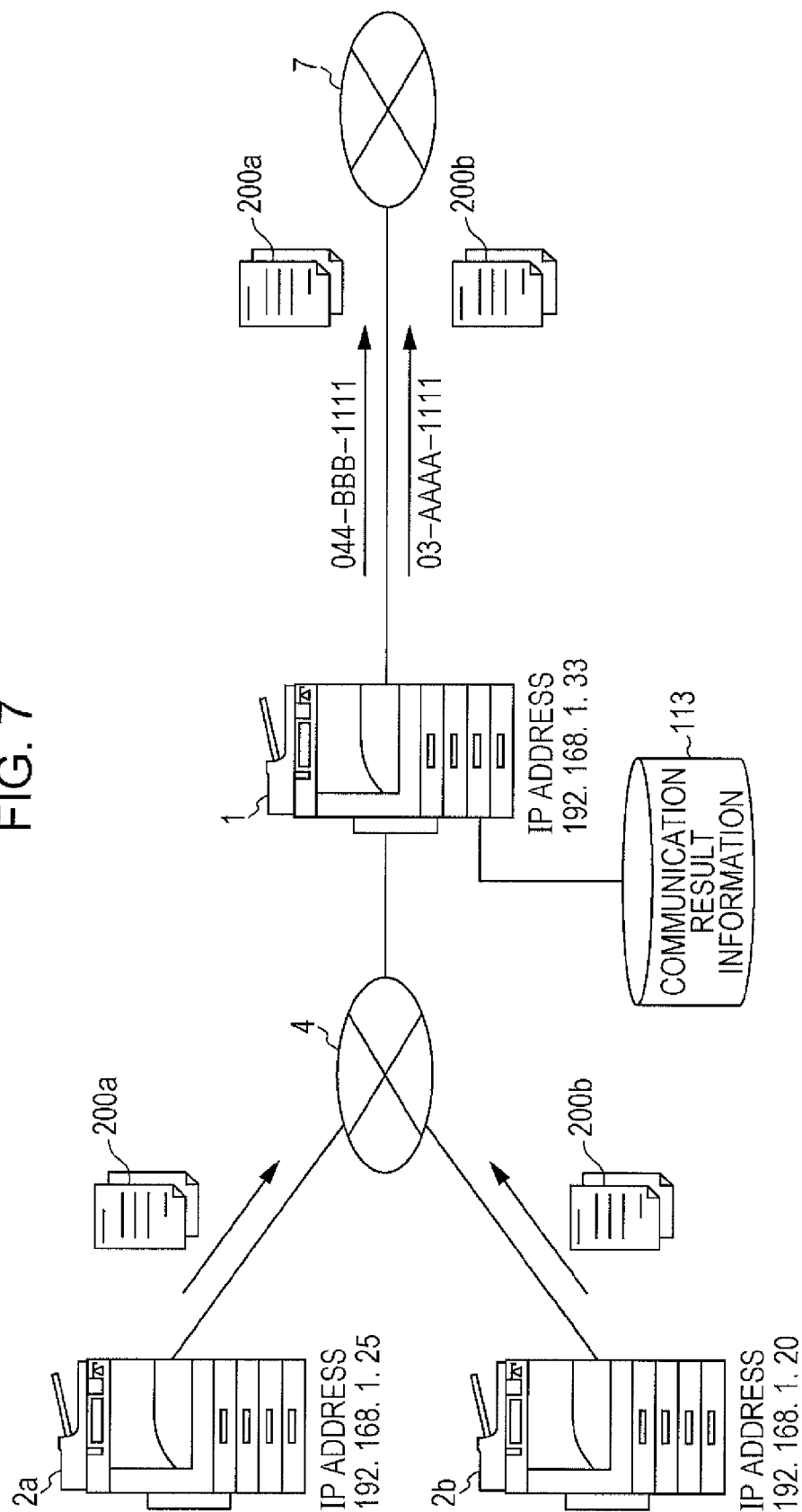


FIG. 8

113B

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002	10-3; 19:25	044-BBB-1111	17 SECONDS	5 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
003	10-4; 8:26	03-AAAA-1122	15 SECONDS	4 PAGES	SG3	—	—	ABNORMAL END
004	10-4; 8:27	044-BBB-9911	10 SECONDS	1 PAGE	G3	IFAX OFF-RAMP	192.168.1.30	NORMAL END
005	10-4; 8:37	044-BBB-9999	15 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
006	10-4; 9:00	03-AAAA-1133	14 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
007	10-4; 9:04	044-BBB-9933	12 SECONDS	3 PAGES	G3 ECM	IFAX OFF-RAMP	192.168.1.45	NORMAL END
008	10-4; 10:29	0522-BBB-3333	8 SECONDS	1 PAGE	G3 ECM	IFAX OFF-RAMP	192.168.1.25	ABNORMAL END
009	10-4; 11:30	03-AAAA-1155	17 SECONDS	5 PAGES	SG3	IFAX OFF-RAMP	192.168.1.30	NORMAL END
010	10-4; 12:30	044-BBB-9988	18 SECONDS	6 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
011	10-4; 13:41	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
012	10-4; 13:50	03-AAAA-1166	15 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.45	NORMAL END
013	10-4; 13:55	0522-BBB-3333	13 SECONDS	3 PAGES	SG3	IFAX OFF-RAMP	192.168.1.20	NORMAL END
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015	10-4; 14:34	03-AAAA-1177	15 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
016	10-4; 14:35	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.40	NORMAL END
017	10-4; 15:35	044-BBB-8833	40 SECONDS	2 PAGES	G3 ECM	IFAX OFF-RAMP	192.168.1.25	ABNORMAL END
018	10-4; 16:01	03-AAAA-1111	15 SECONDS	4 PAGES	SG3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
019	10-4; 16:16	05-CCCC-2211	90 SECONDS	8 PAGES	G3	IFAX OFF-RAMP	192.168.1.25	NORMAL END
020	10-4; 16:36	03-AAAA-1199	13 SECONDS	— PAGES	G3	—	—	ABNORMAL END

FIG. 9

114b


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1	002	10-3; 19:25	044-BBB-9911	17 SECONDS	5 PAGES	SG3	NORMAL END
2	005	10-4; 8:37	044-BBB-9999	15 SECONDS	4 PAGES	SG3	NORMAL END
3	006	10-4; 9:00	03-AAAA-1133	14 SECONDS	4 PAGES	SG3	NORMAL END
4	008	10-4; 10:29	0522-BBB-3333	8 SECONDS	1 PAGE	G3 ECM	ABNORMAL END
5	010	10-4; 12:30	044-BBB-9988	18 SECONDS	6 PAGES	SG3	NORMAL END
6	011	10-4; 13:41	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	NORMAL END
7	015	10-4; 14:34	03-AAAA-1177	15 SECONDS	4 PAGES	SG3	NORMAL END
8	017	10-4; 15:35	044-BBB-8833	40 SECONDS	2 PAGES	G3 ECM	ABNORMAL END
9	018	10-4; 16:01	03-AAAA-1111	15 SECONDS	4 PAGES	SG3	NORMAL END
10	019	10-4; 16:15	06-CCCC-2211	90 SECONDS	8 PAGES	G3	NORMAL END

FIG. 10

114c

COMMUNICATION MANAGEMENT REPORT

IP ADDRESS 192. 168. 1. 25

G3ID: 045-XXXX-1111

DATE AND TIME: 10/04 2011 16:36

DIVISION NAME: FXAT AAA DEVELOPMENT DIV.

PAGE: 1

SENDER NAME: FXAT AAA DEVELOPMENT DIVISION

TRANSMISSION

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3	006	10-4; 9:00	03-AAAA-1133	14 SECONDS	4 PAGES	SG3	NORMAL END
4	008	10-4; 10:29	0522-BBB-3333	8 SECONDS	1 PAGE	G3 ECM	ABNORMAL END
5	010	10-4; 12:30	044-BBB-9988	18 SECONDS	6 PAGES	SG3	NORMAL END
6	011	10-4; 13:41	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	NORMAL END
7	015	10-4; 14:34	03-AAAA-1177	15 SECONDS	4 PAGES	SG3	NORMAL END
8	017	10-4; 15:35	044-BBB-8833	40 SECONDS	2 PAGES	G3 ECM	ABNORMAL END
9	018	10-4; 16:01	03-AAAA-1111	15 SECONDS	4 PAGES	SG3	NORMAL END
10	019	10-4; 16:15	06-CCCC-2211	90 SECONDS	8 PAGES	G3	NORMAL END

RECEPTION

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3	004	10-3; 20:34	0522-BBB-3344	65 SECONDS	4 PAGES	G3	NORMAL END
4	007	10-4; 9:29	044-BBB-9999	38 SECONDS	5 PAGES	SG3	ABNORMAL END
5	009	10-4; 10:38	044-BBB-9988	38 SECONDS	3 PAGES	G3 ECM	NORMAL END
6	012	10-4; 13:50	06-DCBA-4321	24 SECONDS	4 PAGES	SG3	ABNORMAL END
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FIG. 11

114d

COMMUNICATION MANAGEMENT REPORT

IP ADDRESS 192.168.1.25

G3ID: 045-XXXX-1111

DATE AND TIME: 10/04 2011 16:36

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PAGE: 1

SENDER NAME: FXAT AAA DEVELOPMENT DIVISION

TRANSMISSION

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2	005	10-4; 8:36	10-4; 8:37	044-BBB-9999	15 SECONDS	4 PAGES	SG3	NORMAL END
3	006	10-4; 9:00	10-4; 9:05	03-AAAA-1133	14 SECONDS	4 PAGES	SG3	NORMAL END
4	008	10-4; 10:00	10-4; 10:29	0522-BBB-3333	8 SECONDS	1 PAGE	G3 ECM	ABNORMAL END
5	010	10-4; 12:25	10-4; 12:30	044-BBB-9988	18 SECONDS	6 PAGES	SG3	NORMAL END
6	011	10-4; 13:40	10-4; 13:41	0522-BBB-3344	14 SECONDS	4 PAGES	SG3	NORMAL END
7	015	10-4; 14:30	10-4; 14:34	03-AAAA-1177	15 SECONDS	4 PAGES	SG3	NORMAL END
8	017	10-4; 15:30	10-4; 15:35	044-BBB-8833	40 SECONDS	2 PAGES	G3 ECM	ABNORMAL END
9	018	10-4; 16:01	10-4; 16:01	03-AAAA-1111	15 SECONDS	4 PAGES	SG3	NORMAL END
10	019	10-4; 16:15	10-4; 16:15	06-CCCC-2211	90 SECONDS	8 PAGES	G3	NORMAL END

RECEPTION

NO.	DOCUMENT NUMBER	START DATE AND TIME	TARGET	REQUIRED TIME	THE NUMBER OF PAGES	MODE	TRANSFER DATE AND TIME	COMMUNICATION RESULT
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2	003	10-3; 20:15	044-BBB-8833	20 SECONDS	2 PAGES	SG3	10-3; 20:17	ABNORMAL END
3	004	10-3; 20:34	0522-BBB-3344	65 SECONDS	4 PAGES	G3	10-4; 9:00	NORMAL END
4	007	10-4; 9:29	044-BBB-9999	38 SECONDS	5 PAGES	SG3	10-4; 9:32	ABNORMAL END
5	009	10-4; 10:38	044-BBB-9988	38 SECONDS	3 PAGES	G3 ECM	10-4; 10:40	NORMAL END
6	012	10-4; 13:50	06-DCBA-4321	24 SECONDS	4 PAGES	SG3	10-4; 13:55	ABNORMAL END
7	013	10-4; 13:59	03-ABCD-7654	20 SECONDS	2 PAGES	G3 ECM	10-4; 14:02	NORMAL END
8	014	10-4; 14:30	071-DDD-8833	10 SECONDS	1 PAGE	SG3	10-4; 14:35	NORMAL END
9	016	10-4; 15:20	06-ABCD-1111	45 SECONDS	3 PAGES	G3	10-4; 15:30	NORMAL END
10	020	10-4; 16:36	03-AAAA-2211	60 SECONDS	7 PAGES	G3 ECM	10-4; 17:00	NORMAL END

1

RELAY APPARATUS AND
COMPUTER-READABLE MEDIUMCROSS-REFERENCE TO RELATED
APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2013-029735 filed Feb. 19, 2013.

BACKGROUND

Technical Field

The present invention relates to a relay apparatus and a computer-readable medium.

SUMMARY

According to an aspect of the present invention, there is provided a relay apparatus including a reception section, a facsimile communication section, and a generation section. From terminal apparatuses having no facsimile transmission functions, the reception section receives facsimile transmission instructions along with pieces of identification information of the terminal apparatuses via a private network. The facsimile communication section performs facsimile transmission via a public network to the outside on the basis of the facsimile transmission instructions received by the reception section. The generation section generates pieces of communication result information about facsimile transmission for the respective pieces of identification information corresponding to the terminal apparatuses when the facsimile communication section performs the facsimile transmission to the outside.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the present invention will be described in detail based on the following figures, wherein:

FIG. 1 is a schematic view illustrating an exemplary configuration of a communication system according to an exemplary embodiment of the present invention;

FIG. 2 is a block diagram illustrating an exemplary configuration of a relay apparatus;

FIG. 3 is a block diagram illustrating an exemplary configuration of a terminal apparatus;

FIGS. 4A and 4B are schematic views for describing a FAX receiving operation;

FIG. 5 is a schematic view illustrating an exemplary configuration of communication result information;

FIG. 6 is a schematic view illustrating an exemplary configuration of a communication management report;

FIG. 7 is a schematic view for describing a FAX transmission operation;

FIG. 8 is a schematic view illustrating an exemplary configuration of communication result information;

FIG. 9 is a schematic view illustrating an exemplary configuration of a communication management report;

FIG. 10 is a schematic view illustrating an exemplary configuration of a communication management report; and

FIG. 11 is a schematic view illustrating an exemplary configuration of a communication management report.

2

DETAILED DESCRIPTION

First Exemplary Embodiment

Configuration of Communication System

FIG. 1 is a schematic view illustrating an exemplary configuration of a communication system according to a first exemplary embodiment of the present invention.

A communication system 5 includes a relay apparatus 1 and terminal apparatuses 2a to 2c which are connected to each other through a private network 4 so as to be capable of communicating with each other. The relay apparatus 1 is connected to external apparatuses 6a and 6b through a public network 7 so as to be capable of communicating with the external apparatuses 6a and 6b, and receives/transmits information from/to the external apparatuses 6a and 6b by using typically a facsimile (hereinafter, referred to as "FAX") scheme.

The relay apparatus 1 has a FAX transmit/receive function and printer, canner, and copy functions, and includes electronic components, such as a central processing unit (CPU) having a function of processing information and a flash memory. The relay apparatus 1 alone performs FAX transmission. In the first exemplary embodiment, description will be made for the case in which the relay apparatus 1 performs FAX transmission in accordance with FAX transmission instructions transmitted from the terminal apparatuses 2a to 2c on the basis of the Internet FAX (IFAX) standard.

The terminal apparatuses 2a to 2c have no FAX transmit/receive functions but have printer, scanner, and copy functions, and includes electronic components, such as a CPU having a function of processing information and a flash memory. The terminal apparatuses 2a to 2c instruct the relay apparatus 1 to transmit a FAX.

The private network 4 is a communication network which allows high-speed communication, and is a communication network, such as an intranet or a local area network (LAN), which is either wired or wireless.

The external apparatuses 6a and 6b each are any information processing apparatus as long as it has a FAX transmit/receive function, and are, for example, a printer or a personal computer (PC).

The public network 7 is, for example, a communication network that is used on a chargeable basis and that is provided by a communications company, and is an external network, such as a public switched telephone network (PSTN) or an integrated services digital network (ISDN).

FIG. 2 is a block diagram illustrating an exemplary configuration of the relay apparatus 1.

The relay apparatus 1 includes a controller 10 that includes a CPU and the like and that controls the units and executes various programs, a storage unit 11 that includes a storage medium such as a flash memory and that stores information, a communication unit 12 that communicates with the outside via the private network 4, a FAX communication unit 13 that communicates with the outside via the public network 7 by using the FAX scheme, a print unit 14 that performs printing on paper, and a scanning unit 15 that optically scans paper on which characters, images, and the like are written. The relay apparatus 1 may also include a display unit that displays, for example, characters and images, and an operation unit that is used to operate the relay apparatus 1.

The controller 10 executes a FAX transmit/receive program 110 described below, thereby serving as a mail communication section 100, a mail-title analysis section 101, a mail-contents analysis section 102, a FAX communication section 103, a received-FAX distribution section 104, a communica-

tion-result-information generation section **105**, a communication-management-report generation section **106**, and the like.

The mail communication section **100** receives/transmits electronic mails from/to the terminal apparatuses **2a** to **2c** via the private network **4**. The mail communication section **100** also serves as a reception section that receives a mail including especially a FAX transmission instruction using IFAX.

The mail-title analysis section **101** analyzes, for example, the transmission destination of a FAX transmission from the FAX transmission instruction using IFAX which is included in the mail title of an electronic mail received by the mail communication section **100**.

The mail-contents analysis section **102** analyzes the setting that is used when a FAX is transmitted, from the contents of an electronic mail received by the mail communication section **100**.

The FAX communication section **103** converts analysis results obtained from the mail-title analysis section **101** and the mail-contents analysis section **102** into a signal using the FAX scheme, and controls the FAX communication unit **13** so that the FAX communication unit **13** receives/transmits image information of a document by using the FAX scheme.

The received-FAX distribution section **104** distributes image information of a document received from the outside via the FAX communication unit **13**, to a distribution box in accordance with the destination of the document. The relay apparatus **1** uses multiple phone numbers as destinations to perform FAX reception.

When the FAX communication section **103** receives/transmits image information of a document, the communication-result-information generation section **105** collects information, such as the date and time when the document is received/transmitted, the target of the communication, a time period required for the communication, the number of pages of the document, and whether or not the communication is normally completed, and generates a piece of communication result information **113** from the collected information.

The communication-management-report generation section **106** distributes pieces of the communication result information **113** generated by the communication-result-information generation section **105** to the destinations corresponding to the terminal apparatuses **2a** to **2c**, and generates a communication management report **114**.

The storage unit **11** stores, for example, the FAX transmit/receive program **110** for causing the controller **10** to operate as the sections **100** to **106** described above, transfer-destination information **111** for the individual boxes, distribution-box information **112** for individual dial-in numbers, the communication result information **113**, and the communication management report **114**.

The transfer-destination information **111** for the individual boxes is information in which the identifiers of distribution boxes which temporarily store pieces of image information of documents received through FAX in accordance with the destinations obtained in reception are associated with the IP addresses of the transfer destinations (terminal apparatuses **2a** to **2c**) allocated to the distribution boxes.

The distribution-box information **112** for individual dial-in numbers is information in which a phone number that is the destination of a document received through FAX is associated with the identifier of a distribution box. Multiple phone numbers are registered using a dial-in scheme in the relay apparatus **1**, and the registered numbers are associated with the respective terminal apparatuses **2a** to **2c**.

The communication unit **12** receives/transmits data via the private network **4** in accordance with a communication pro-

tolocol such as TCP/IP, and performs control regarding the network and control of reception/transmission of electronic mails.

The FAX communication unit **13** has a modem function of modulating and demodulating image data in accordance with a facsimile protocol, such as G3 or G4, and has a network control unit (NCU) function of controlling connection to the public network **7** so as to perform FAX communication via the public network **7**.

FIG. **3** is a block diagram illustrating an exemplary configuration of the terminal apparatuses **2a** to **2c**. The configurations of the terminal apparatuses **2a** to **2c** are similar to each other. Accordingly, description will be made by taking the terminal apparatus **2a** as a typical example.

The terminal apparatus **2a** includes a controller **20** that includes a CPU and the like and that controls the units and executes various programs, a storage unit **21** that includes a storage medium such as a flash memory and that stores information, a communication unit **22** that communicates with the outside via the private network **4**, a print unit **23** that performs printing on paper, and a scanning unit **24** that optically scans paper on which characters, images, and the like are written. The terminal apparatus **2a** may also include a display unit that displays, for example, characters and images, and an operation unit that is used to operate the terminal apparatus **2a**.

The controller **20** executes a FAX transmit/receive program **210** described below, thereby serving as a FAX reception section **200**, a mail-contents generation section **201**, a mail-title generation section **202**, a mail communication section **203**, a received-FAX reception section **204**, and the like.

The FAX reception section **200** receives a FAX transmission request from a user of the terminal apparatus **2a**. A user operating the operation unit (not illustrated) inputs a FAX transmission request along with the phone number of a transmission destination, and the scanning unit **24** reads out a document that is to be transmitted through FAX.

The mail-contents generation section **201** generates the contents of an electronic mail that is to be transmitted to the relay apparatus **1**, on the basis of the FAX transmission request received by the FAX reception section **200** and the phone number of the transmission destination.

The mail-title generation section **202** generates the mail title of the electronic mail that is to be transmitted to the relay apparatus **1**, on the basis of the FAX transmission request received by the FAX reception section **200** and the phone number of the transmission destination.

The mail communication section **203** receives/transmits electronic mails from/to the relay apparatus **1** via the private network **4**.

The received-FAX reception section **204** receives image information stored in the distribution box corresponding to the terminal apparatus **2a** among pieces of image information of received documents that are temporarily stored in the relay apparatus **1**, via the private network **4**.

The storage unit **21** stores, for example, the FAX transmit/receive program **210** for causing the controller **20** to operate as the above-described sections **200** to **204**, and relay apparatus information **211**.

The relay apparatus information **211** is information about the IP address of a relay apparatus to which the terminal apparatus **2a** is allowed to transmit a FAX transmission instruction.

Operations of Communication System

The operations of the communication system **5** according to the first exemplary embodiment will be described below with reference to FIGS. **1** to **6** on the following topics: (1) a basic operation; (2) an operation of generating communica-

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tion result information; and (3) an operation of generating a communication management report.

(1) Basic Operation

FIGS. 4A and 4B are schematic views for describing a FAX receiving operation.

As illustrated in FIG. 4A, the FAX communication section 103 of the relay apparatus 1 receives pieces of image information 103a and 103b of documents through FAX from the outside via the public network 7. The relay apparatus 1 is capable of receiving phone numbers by using dialing-in. The relay apparatus 1 receives the image information 103a of one document through FAX by using the phone number "045-XXXX-1111", whereas the relay apparatus 1 receives the image information 103b of another document through FAX by using the phone number "045-XXXX-1114".

Then, the received-FAX distribution section 104 of the relay apparatus 1 refers to the distribution-box information 112 for the individual dial-in numbers which is illustrated in FIG. 4B, and distributes the image information 103a and the image information 103b of the documents to the distribution boxes "010" and "030", respectively, in accordance with the phone numbers.

Then, the received-FAX distribution section 104 of the relay apparatus 1 refers to the transfer-destination information 111 for the individual boxes which is illustrated in FIG. 4B, and transmits the image information 103a and the image information 103b of the documents in the distribution boxes "010" and "030" to the terminal apparatuses 2a and 2b corresponding to the IP addresses "192.168.1.25" and "192.168.1.20" via the private network 4.

(2) Operation of Generating Communication Result Information

When the FAX communication section 103 receives the image information 103a and the image information 103b of the documents through FAX from the outside via the public network 7 as in "(1) Basic operation" described above, the communication-result-information generation section 105 generates information about the FAX reception as the communication result information 113 in the storage unit 11.

FIG. 5 is a schematic view illustrating an exemplary configuration of the communication result information 113.

Communication result information 113A is exemplary communication result information 113, and indicates information about FAX receptions performed by the FAX communication section 103. The communication result information 113A stores a document number for identifying each document, a start date and time when a FAX reception was started, a target indicating a FAX sender, a time required for a FAX reception, the number of pages of a document, a mode indicating a FAX communication mode, a communication type indicating whether a reception was distributed by using a phone number or was directly received by the relay apparatus 1, a distribution box to which distribution was performed when a reception was distributed by using a phone number, and a communication result indicating whether or not a FAX reception was normally performed.

(3) Operation of Generating Communication Management Report

Then, the communication-management-report generation section 106 refers to the communication result information 113A generated by the communication-result-information generation section 105. For example, when the number of communication results corresponding to the distribution box "010" reaches a predetermined number, the communication-management-report generation section 106 generates a communication management report 114 from the communication results.

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The timing of generation of a communication management report 114 is a timing when the number of communication results reaches the predetermined number. Alternatively, the timing may be a timing when a predetermined time point has come, a timing when a predetermined time period has elapsed, or a timing obtained by combining these. Further, every time one communication result is obtained, the communication result may be added to the communication management report 114.

FIG. 6 is a schematic view illustrating an exemplary configuration of the communication management report 114.

A communication management report 114a is an exemplary communication management report 114, and indicates information about FAX receptions of the terminal apparatus 2a. The communication management report 114a describes items similar to those of the communication result information 113A, but does not describe a communication type and a distribution box.

The mail communication section 100 transmits the communication management report 114a via the private network 4 to the terminal apparatus 2a. The communication management report 114a may be transmitted by using IFAX or by using an electronic mail to which the communication management report 114a is attached. Alternatively, the communication management report 114a may be stored in the distribution box "010" and may be transmitted to the terminal apparatus 2a in a manner similar to that for the image information 103a of a document.

Second Exemplary Embodiment

A second exemplary embodiment is different from the first exemplary embodiment in which a communication management report about FAX reception is generated. The difference is in that a communication management report about FAX transmission is generated.

Operations of Communication System

The operations of the communication system 5 according to the second exemplary embodiment will be described below with reference to FIGS. 1 to 3 and 7 to 9 on the following topics: (1) a basic operation; (2) an operation of generating communication result information; and (3) an operation of generating a communication management report. Operations similar to those in the first exemplary embodiment will not be described.

(1) Basic Operation

FIG. 7 is a schematic view for describing a FAX transmission operation.

As illustrated in FIG. 7, users of the terminal apparatuses 2a and 2b operate the operation units (not illustrated) of the terminal apparatuses 2a and 2b, and prepare for FAX transmission. Description will be made below by taking the operations of the terminal apparatus 2a as a typical example, and the operations of the terminal apparatus 2b will be described in parentheses when they are different from those of the terminal apparatus 2a.

In response to an operation performed by a user, the FAX reception section 200 of the terminal apparatus 2a starts reception of a FAX transmission request. The FAX reception section 200 receives the phone number of a transmission destination, and prompts the user to set a document which is to be a target of the FAX transmission on the document table of the scanning unit 24 of the terminal apparatus 2a.

The user inputs the phone number of a transmission destination, sets a document on the document table, and operates the operation unit so as to cause the scanning unit 24 to scan the document.

The FAX reception section **200** of the terminal apparatus **2a** causes the scanning unit **24** to scan the document optically, and generates image information **200a** (**200b**).

As illustrated in FIG. 7, the terminal apparatus **2a** attaches the generated image information **200a** of the document to an electronic mail having a mail title including “FAX=044BBB1111@[192.168.1.33]” (“FAX=03AAAA1111@[192.168.1.33]”), and transmits the mail, thereby instructing the relay apparatus **1** to perform FAX transmission.

The mail-contents generation section **201** generates the contents of the electronic mail that is to be transmitted to the relay apparatus **1**, on the basis of the FAX transmission request received by the FAX reception section **200** and the phone number of the transmission destination. In the second exemplary embodiment, particular text or the like is not input in the contents.

The mail-title generation section **202** generates the mail title of the electronic mail that is to be transmitted to the relay apparatus **1**, on the basis of the FAX transmission request received by the FAX reception section **200** and the phone number of the transmission destination. In the example illustrated in FIG. 7, the phone number of the FAX transmission destination is “044-BBB-1111” (“03-AAAA-1111”), and the IP address of the relay apparatus **1** is “192.168.1.33”. Accordingly, the mail title is “FAX=044BBB1111@[192.168.1.33]” (“FAX=03AAAA1111@[192.168.1.33]”).

The mail communication section **203** attaches the image information **200a** (**200b**) to the electronic mail generated by the mail-contents generation section **201** and the mail-title generation section **202**, and transmits the mail to the relay apparatus **1**.

The mail communication section **100** of the relay apparatus **1** receives the electronic mail transmitted by the terminal apparatus **2a**. The mail-title analysis section **101** analyzes the mail title of “FAX=044BBB1111@[192.168.1.33]” (“FAX=03AAAA1111@[192.168.1.33]”), and recognizes “044-BBB-1111” (“03-AAAA-1111”) as the FAX number of the transmission destination.

The FAX communication section **103** transmits the image information **200a** (**200b**) attached to the electronic mail, through FAX to “044-BBB-1111” (“03-AAAA-1111”).

(2) Operation of Generating Communication Result Information

When the FAX communication section **103** transmits the image information **200a** and the image information **200b** through FAX via the public network **7** to the outside as in “(1) Basic operation” described above, the communication-result-information generation section **105** generates information about the FAX transmission as the communication result information **113** in the storage unit **11**.

FIG. 8 is a schematic view illustrating an exemplary configuration of the communication result information **113**.

Communication result information **113B** is exemplary communication result information **113**, and indicates information about FAX transmissions performed by the FAX communication section **103**. The communication result information **113B** describes items similar to those of the communication result information **113A**, but describes an instruction source instead of a distribution box. An instruction source indicates the IP address of a terminal apparatus which transmitted a FAX transmission instruction.

(3) Operation of Generating Communication Management Report

The communication-management-report generation section **106** refers to the communication result information **113B** generated by the communication-result-information genera-

tion section **105**. For example, when the number of communication results corresponding to the instruction source of “192.168.1.25” reaches a predetermined number, the communication-management-report generation section **106** generates a communication management report **114** from the communication results.

FIG. 9 is a schematic view illustrating an exemplary configuration of the communication management report **114**.

A communication management report **114b** is an exemplary communication management report **114**, and indicates information about FAX transmissions performed for the terminal apparatus **2a**. The communication management report **114b** describes items similar to those of the communication result information **113B**, but does not describe a communication type and an instruction source.

The mail communication section **100** transmits the communication management report **114b** via the private network **4** to the terminal apparatus **2a**. The communication management report **114b** may be transmitted by using the IFAX scheme or by using an electronic mail to which the communication management report **114b** is attached. Alternatively, the communication management report **114b** may be stored in the distribution box “010” and may be transmitted to the terminal apparatus **2a** in a manner similar to that for the image information of a received document.

Third Exemplary Embodiment

A third exemplary embodiment is one obtained by combining the communication management report **114a** in the first exemplary embodiment which is generated for reception with the communication management report **114b** in the second exemplary embodiment which is generated for transmission.

FIG. 10 is a schematic view illustrating an exemplary configuration of the communication management report **114**.

A communication management report **114c** is an exemplary communication management report **114**, and indicates the combination of information about FAX reception and information about FAX transmission for the terminal apparatus **2a**. The communication management report **114c** describes items similar to those of these pieces of information.

The communication result information **113** used when the communication management report **114c** is generated is obtained by combining the communication result information **113A** in the first exemplary embodiment and the communication result information **113B** in the second exemplary embodiment.

Fourth Exemplary Embodiment

Compared with the first to third exemplary embodiments, a fourth exemplary embodiment is different in that a date and time when the relay apparatus **1** received a FAX transmission instruction in FAX transmission is added and that a date and time when the image information of a document was transmitted to a terminal apparatus in FAX reception is added.

FIG. 11 is a schematic view illustrating an exemplary configuration of the communication management report **114**.

A communication management report **114d** is an exemplary communication management report **114**, and indicates information obtained by combining information about FAX reception with information about FAX transmission for the terminal apparatus **2a**. The communication management report **114d** describes a reception date and time of the relay apparatus as information about transmission and a transfer date and time as information about reception.

The reception date and time of the relay apparatus is a date and time when the mail communication section **100** of the

relay apparatus **1** received a FAX transmission instruction from a corresponding one of the terminal apparatuses **2a** to **2c**.

The transfer date and time is a date and time when the mail communication section **100** of the relay apparatus **1** transmitted the image information of a document which was received by the FAX communication section **103** from the outside and which was stored in a distribution box by the received-FAX distribution section **104**, from the distribution box to a corresponding one of the terminal apparatuses **2a** to **2c**.

The communication-management-report generation section **106** compares a reception date and time of the relay apparatus with a start date and time, and compares a transfer date and time with a start date and time. When the time interval between these time points is larger than a predetermined interval, the communication-management-report generation section **106** may emphasize, for example, highlights, display of such information in the communication management report **114d**.

Other Exemplary Embodiments

The present invention is not limited to the above-described exemplary embodiments, and various modifications may be made as long as they do not depart from the gist of the present invention.

The FAX transmit/receive programs **110** and **210** described above may be provided by using a storage medium such as a compact disc-read-only memory (CD-ROM) storing them, or may be downloaded from, for example, a server apparatus connected to a network such as the Internet to a storage unit in the apparatuses. Alternatively, some or all of the units **100** to **106** and **200** to **204** may be achieved through hardware such as an application-specific integrated circuit (ASIC). The steps in the operations described in the above-described exemplary embodiments may be modified in such a manner that change of the execution sequence, a skip of some of the steps, and addition of steps are performed.

The foregoing description of the exemplary embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

1. A relay apparatus comprising:

a reception section that receives, from a plurality of terminal apparatuses having no facsimile transmission functions, facsimile transmission instructions along with pieces of identification information of the plurality of terminal apparatuses via a private network;

a facsimile communication section that performs facsimile transmission via a public network to the outside on the basis of the facsimile transmission instructions received by the reception section;

a generation section that generates pieces of communication result information about facsimile transmission for the respective pieces of identification information corresponding to the plurality of terminal apparatuses when the facsimile communication section performs the facsimile transmission to the outside; and

a communication management report generation section that generates a communication management report, the report including a plurality of the communication results,

wherein the generation section emphasizes display of a facsimile transmission in which a time period from a first date and time to a second date and time is equal to or longer than a predetermined time period, the first date and time indicating when the reception section received a facsimile transmission instruction from a terminal apparatus of the plurality of apparatuses, the second date and time indicating when the facsimile communication section finished communication with the outside.

2. The relay apparatus according to claim 1,

wherein the generation section has at least a date and time when the facsimile communication section finished a transmission to the outside, as the communication result information.

3. The relay apparatus according to claim 2,

wherein the generation section further has a date and time when the reception section received a facsimile transmission instruction from the terminal apparatus among the plurality of terminal apparatuses, as the communication result information.

4. A relay apparatus comprising:

a facsimile communication section that performs facsimile reception from the outside through lines of a public network which correspond to a plurality of terminal apparatuses having no facsimile reception functions and being capable of communicating with the facsimile communication section via a private network;

a generation section that generates pieces of communication result information about facsimile reception for the respective lines corresponding to the plurality of terminal apparatuses when the facsimile communication section performs the facsimile reception from the outside;

a communication management report generation section that generates a communication management report, the report including a plurality of the communication results; and

a distribution section that distributes documents received through facsimile from the outside by the facsimile communication section, to the plurality of terminal apparatuses corresponding to the lines,

wherein the generation section emphasizes display of a facsimile reception in which a time period from a first date and time to a second date and time is equal to or longer than a predetermined time period, the first date and time indicating when the facsimile communication section started a reception from the outside, the second date and time indicating when the distribution section distributed the document to a terminal apparatus of the plurality of apparatuses.

5. The relay apparatus according to claim 4,

wherein the generation section has at least a date and time when the facsimile communication section started a reception from the outside, as the communication result information.

6. The relay apparatus according to claim 5,

wherein the generation section further has a date and time when the distribution section distributed a document among the received documents to the terminal apparatus among the plurality of terminal apparatuses, as the communication result information.

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7. A non-transitory computer readable medium storing a program causing a computer to execute a process for receiving/transmitting a facsimile, the process comprising:

- receiving, from a plurality of terminal apparatuses having no facsimile transmission functions, facsimile transmission instructions along with pieces of identification information of the plurality of terminal apparatuses via a private network; 5
- performing facsimile transmission via a public network to the outside on the basis of the received facsimile transmission instructions; 10
- generating pieces of communication result information about facsimile transmission for the respective pieces of identification information corresponding to the plurality of terminal apparatuses when the facsimile transmission is performed to the outside; and 15
- generating a communication management report, the report including a plurality of the communication results, 20
- wherein generating the pieces of communication result information emphasizes display of a facsimile transmission in which a time period from a first date and time to a second date and time is equal to or longer than a predetermined time period, the first date and time indicating when the facsimile transmission instruction was received from a terminal apparatus of the plurality of apparatuses, the second date and time indicating when the communication finished with the outside. 25

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8. A non-transitory computer readable medium storing a program causing a computer to execute a process for receiving/transmitting a facsimile, the process comprising:

- performing facsimile reception from the outside through lines of a public network which correspond to a plurality of terminal apparatuses having no facsimile reception functions and being capable of performing communication section via a private network;
- generating pieces of communication result information about facsimile reception for the respective lines corresponding to the plurality of terminal apparatuses when the facsimile reception is performed from the outside;
- generating a communication management report, the report including a plurality of the communication results; and
- distributing documents received through facsimile reception from the outside, to the plurality of terminal apparatuses corresponding to the lines,
- wherein the generating pieces of communication result information emphasizes display of a facsimile reception in which a time period from a first date and time to a second date and time is equal to or longer than a predetermined time period, the first date and time indicating when a reception from the outside was started, the second date and time indicating when the document was distributed to a terminal apparatus of the plurality of apparatuses.

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